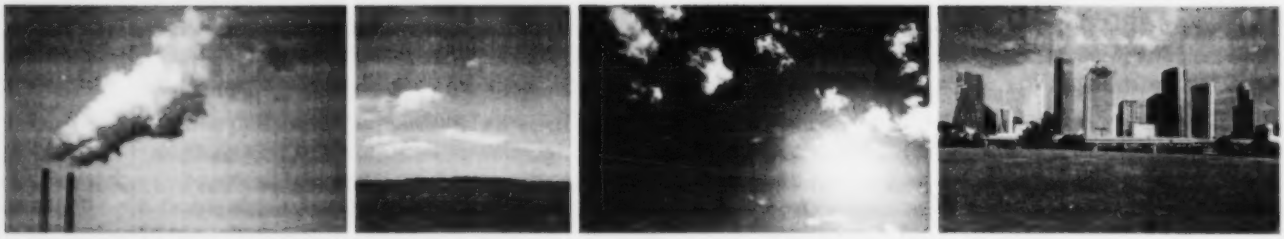

Particulate Matter and Ozone Management Plan Guidance Document

Prepared by Alberta Environment
September 25, 2007

Purpose of this Document

This document was developed in response to a need expressed by airsheds to be provided with a base level of information to support the development of Particulate Matter (PM) and Ozone Management Plans. As a partner in the management and stewardship of air quality in Alberta, Alberta Environment (AENV) is pleased to be able to provide this guidance document.

The purpose of this document is to provide airsheds with an understanding of the elements of a PM and Ozone Management Plan as well as a conceptual framework that could be included in the plan development process.

The process and content suggestions contained in this document are not meant to be templates that airsheds must follow, but as tools that airsheds could used to build their management plans.

This document's sections address the following topics:

- Section 2 describes the guiding principles and overarching approach (or ***process***) that may be used to develop a PM and Ozone Management Plan.
- Section 3 describes the ***content*** that may appear in an air quality or PM and Ozone Management Plan.
- Section 4 contains additional resources that may be helpful in developing a PM and Ozone Management Plan.

1. Background and Introduction

1.1. Background

The development of PM and Ozone Management Plans is an action related to the Clean Air Strategic Alliance's (CASA) PM and Ozone Management Framework. This framework established a series of thresholds at which increasingly stringent levels of management tools are required to insure that the desired environmental outcomes are achieved. The identified Action Levels were endorsed by Alberta Environment and stakeholder groups, and as a result the goals of the Management Systems are identified

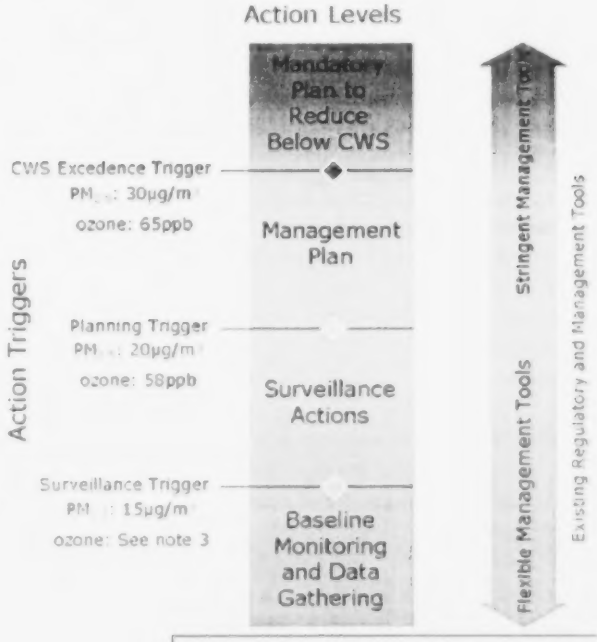

Figure 1: Alberta's Particulate Matter and Ozone Management Framework. Extracted from the CASA Particulate Matter and Ozone Management Framework

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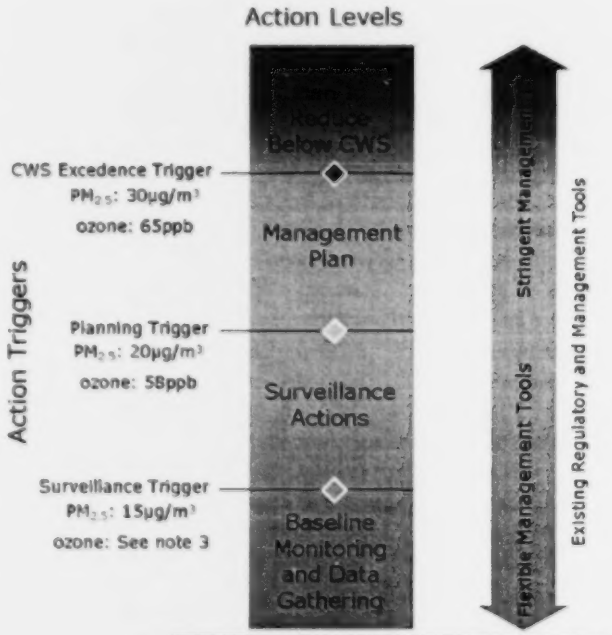


Figure 1: Alberta's Particulate Matter and Ozone Management Framework. Extracted from the CASA Particulate Matter and Ozone Management Framework

and understood. The framework is one of the critical enablers of this project. The Action Levels are outlined in Figure 1.

Alberta Environment notified stakeholders that the *Planning Trigger* of the CASA PM and Ozone Management Framework has been exceeded in several locations. When the planning trigger is exceeded, the framework calls for the development of management plans to ensure that the Canada-wide standards for PM and Ozone are not exceeded. Ozone management plans are needed for the Edmonton and Calgary Census Metropolitan Areas (CMAs) as well as areas included within the boundaries of the Fort Air Partnership (FAP), West Central Airshed Society (WCAS) and the Parkland Airshed Management Zone (PAMZ). The framework calls for these plans to be developed by November 2008.

1.2. Air Quality Management in Alberta

There are many players involved in managing air quality in Alberta. Each stakeholder brings a unique perspective to the table and should be considered in the development of a PM and Ozone Management Plan. The following table depicts the key stakeholders involved in air quality management in Alberta and their respective role in the process:

Key Stakeholder	Role in Air Quality Management
Alberta Environment	Contribute as a key partner in developing air quality management plans by providing technical expertise, guidance, leadership and resources throughout the process. If airshed partnerships do not develop air quality management plans within the two year timeline, then it is the responsibility of AENV to develop the plan.
Federal Government	TBD at October 3rd Session
Airshed Zone	TBD at October 3rd Session
Municipalities/Regional Organizations	TBD at October 3rd Session
Industry	TBD at October 3rd Session
Non-governmental organizations	TBD at October 3rd Session
Alberta Residents	TBD at October 3rd Session
First Nations	TBD at October 3rd Session
Other GoA Ministries and Agencies (e.g. Municipal Affairs, Health, EUB)	TBD at October 3rd Session

Alberta Environment (AENV) is a key partner in the air quality management plan development process. The role of AENV as a partner includes provision of resources, technical expertise, guidance and leadership throughout the process. If airshed partnerships do not develop air quality management plans within the two year timeline, then it is the responsibility of AENV to take the lead and develop the plan. AENV is also the regulator for many of the industries involved in the process. Therefore, management activities that pertain to industries that AENV regulates could be incorporated into approvals or into regulations developed by AENV. It is also AENV's role to work with, or lobby if necessary, other GOA departments and other levels of government to facilitate implementation of air quality management tools. Ultimately, it is AENV's responsibility to assure the quality of Alberta's environment. AENV's policy is to deliver this mandate in partnership and in collaboration with stakeholders. However, a regulatory backstop must be in place to ensure our mandate is delivered.

2. Particulate Matter and Ozone Management Plan Development: A Conceptual Approach

In its simplest form, a PM and Ozone Management Plan is similar to other plans. It is a series of steps (or activities) to be carried out in order to achieve a particular goal. This section of the document contains a conceptual approach that may by used by airsheds to develop plans. These steps are based on successful approaches to developing plans used by other regionally based groups (e.g. water management plans).

Consideration should be given to how this approach may be altered to fit the unique needs and circumstances of the airsheds.

2.1 Inclusion of Guiding Principles

The development of a management plan often begins with the guiding principles or values that the plan development team will follow.

The following list of guiding principles may be considered by the airsheds when developing a PM and Ozone Management Plan. The airsheds could then add or change the principles to accommodate the unique circumstances or needs of the airsheds.

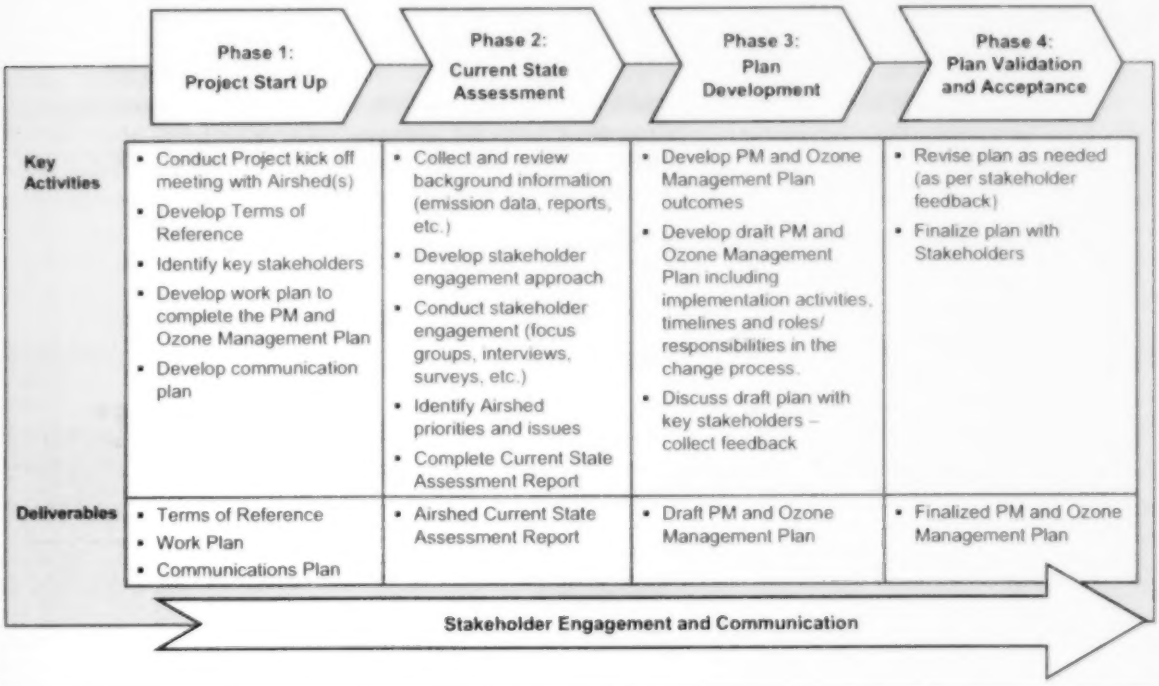
- Consult with all stakeholders that may be affected.
- Use a consensus approach to build the plan.
- Set realistic regional or airshed-specific outcomes and targets.
- Ensure the outcomes and targets are aligned with outcomes established through other processes such as Canada Wide Standards, CASA, federal government and provincial government.
- Ensure that all partners involved in developing the plan (or impacted by the plan) are involved and accountable for implementation
- Ensure meaningful stakeholder commitment – i.e. participating stakeholders sign off on the plan.
- Ensure the commitment to continuous Improvement.
- Ensure performance of the plan is measured, reported and reviewed.

2.2 Conceptual Development Work Plan

The following diagram shows four major phases that could be used to develop and implement a PM and Ozone Management Plan. Additional details for each phase are described in the section following the diagram.

Since this development work plan is a suggested approach only, additional activities may need to be added or removed depending on the unique circumstances of each airshed.

PM and Ozone Management Plan – Conceptual Development Work Plan


Phase 1: Project Start Up
Phase 2: Current State Assessment
Phase 3: Plan Development
Phase 4: Plan Validation and Acceptance
Key Activities
• Conduct Project kick off meeting with Airshed(s)
• Develop Terms of Reference
• Identify key stakeholders
• Develop work plan to complete the PM and Ozone Management Plan
• Develop communication plan
• Collect and review background information (emission data, reports, etc.)
• Develop stakeholder engagement approach
• Conduct stakeholder engagement (focus groups, interviews, surveys, etc.)
• Identify Airshed priorities and issues
• Complete Current State Assessment Report
• Develop PM and Ozone Management Plan outcomes
• Develop draft PM and Ozone Management Plan including implementation activities, timelines and roles/ responsibilities in the change process.
• Discuss draft plan with key stakeholders – collect feedback
• Revise plan as needed (as per stakeholder feedback)
• Finalize plan with Stakeholders
Deliverables
• Terms of Reference
• Work Plan
• Communications Plan
• Airshed Current State Assessment Report
• Draft PM and Ozone Management Plan
• Finalized PM and Ozone Management Plan
Stakeholder Engagement and Communication

Phase 1: Project Start Up

The Start Up phase would be used to establish the Terms of Reference for the team that will be responsible for developing the plan, and to develop the work plan and timeline to deliver the plan.

The creation of a detailed Terms of Reference (TOR) is critical to the success of any plan development. The TOR provides specific details of what is to be undertaken and when, and describes the purpose, structure, and direction of the development. It should be developed in consultation with stakeholders in the airsheds.

The TOR could include:

- Brief project background and Introduction (geographic description of planning area)
- Guiding principles in developing the plan
- Vision, objectives, scope and deliverables of the planning process

- Approach to developing the plan (including stakeholder consultation process used)
- Overview of current conditions and initial description of issues
- Description of key stakeholders (including their role relative to PM and Ozone management)
- Roles, responsibilities and accountability of those involved
- Potential linkages with Regional Strategies
- Information and resource requirements
- Proposed schedule for planning process

The Start Up phase would be used to identify key stakeholders that will be consulted during the project. Stakeholders are individuals or groups who have an interest in the outcome of the project, and as such, may be consulted or involved in the project to develop a PM and Ozone Management Plan. This stakeholder engagement and consultation would continue throughout the planning and implementation process.

Also, a communications plan could be developed that would articulate how key stakeholders would be communicated to and in what form. A sample communication plan outline is included in Appendix A.

Phase 2: Current State Assessment

A Current State Assessment is a document that summarizes the current conditions (e.g. environmental, social, economic) of given airsheds. A Current State Assessment is the product of stakeholder interviews/discussions and a review of relevant background information. Completing a current state assessment would be a critical step as it will become the foundational document on which the plan is based, and will identify any informational gaps that may exist.

Some topics that may be in a Current State Assessment include the following:

- A description of unique issues or circumstances the airsheds must consider or address in the Management Plan.
- Current (available) emissions and air quality data, and other data relevant to the issues.
- Current regulatory policies, legislation, existing plans and commitments, bylaws and other relevant documents that affect the airsheds.
- Relevant conditions in neighboring airsheds that would affect the Management Plan.
- A description of key stakeholders, including municipalities, contained within the plan

Consideration should be given to how to consult key stakeholders so that their input and interests are included in the current state assessment. The objective of stakeholder consultation is to engage stakeholders in creating a solution to a problem and the process of

developing a PM and Ozone Management Plan. Some benefits of open stakeholder consultation include:

- Broader input may lead to quality decision-making. A broader perspective challenges traditional thinking and sparks creativity in problem solving.
- Improved stakeholder satisfaction with the PM and Ozone Management Plan may come from direct involvement in creating it.
- Good governance, transparency and open communication are served when groups communicate and receive feedback from stakeholders, instead of being guided by personal or group agendas.

Opportunities for active involvement could include participation in advisory committees, participation in joint problem solving workshops or consensus building forums, and participation in stakeholder interviews.

Before engaging in a stakeholder consultation exercise, it would be important to develop a plan to determine which stakeholders to engage as well as what specifically they will be doing. These decisions will drive a plan to engage stakeholders in a way that will provide the information that is needed (e.g. expertise, interests, perspective, content, etc.) in the most appropriate way.

Phase 3: Plan Development

The objective of this phase is to develop a comprehensive plan based on a series of common facts and well-understood stakeholder interests.

The first part of plan development could be to develop regional or airshed-specific outcomes and targets that the PM and Ozone Management Plan would be striving for.

Information collected in the Current State Assessment would be evaluated, and options to address the issues would be identified. This would include the mechanisms and resources required to implement the options, as well as the benefits and consequences of each of the options. The actual plan could include details such as the management tools and performance measurements that were selected after the evaluation.

An important part of the draft plan would be the implementation plan which would include the key actions, timelines, and roles and responsibilities in implementation.

A proposed outline of what airsheds could include in the management plan can be found in Section 3 of this document.

Phase 4: Plan Validation and Acceptance

The objective of this phase would be to validate the PM and Ozone Management plan through further consultation with stakeholders and finalize a plan that is mutually agreeable. The outcome of this phase is the commitment from plan participants to implement the actions described in the plan.

3. PM and Ozone Management Plan: A Proposed Outline

The following section describes the elements that may be included in the PM and Ozone Management Plan for an Airshed Zone:

- Background and Introduction:
    - High level description of the current state of the airsheds and key airshed issues
    - Guiding principles of the plan
- Base year and expected future emission data:
    - Defines the starting point that will be measured against, and also demonstrates future expectations or issues.
    - To eliminate duplication of effort and improve efficiency, air emissions data should be collected/provided in coordination with adjacent airsheds and Alberta Environment.
- Current ambient air quality in the airshed:
    - Provide a summary of air quality in the airshed with the specific focus on air quality issues relevant to particulate matter and ozone.
- Predicted air quality in the airshed:
    - Predicted air quality should be conducted through applying tools such as air quality modeling. If ozone is the issue, than modeling of photochemical smog should be conducted.
    - The modeling should be done for current and future air emission scenarios and should include all relevant sources.
    - To eliminate duplication of effort and improve efficiency, the modeling could be conducted in coordination with adjacent airsheds that are also developing air quality management plans
- Description of priority action areas for the airshed:
    - Identify the issues affecting individual airsheds with an inclusive, comprehensive and forward thinking approach.
    - Set regional or airshed-specific outcomes and targets.
- Management Actions:
    - A series of strategies and actions that can be directly linked to PM and Ozone emission sources, priority action areas and issues identified by the Airshed. This would include the benefits and consequences of the management actions selected, and an explanation of the mechanisms and resources required to implement.
    - The plan may include short, medium and long term goals and actions.

- Public Education and Communication Plan:
    - Some of the management actions selected may involve education or communication. Also, ensuring the stakeholders are aware of their responsibilities will require ongoing communication.
- Performance targets, key performance indicators and performance monitoring:
    - Targets may take years to achieve, so a method of monitoring the progress towards achieving the targets is needed.
    - Identify the indicators that will be used to measure success, and their variability.
    - Identify the monitoring that would be required to measure the indicators, and who would be responsible for the monitoring and reporting.
- Implementation Plan (including timelines):
    - It is important to develop an implementation plan that identifies the key activities (including management actions, education and communication) that are to be undertaken, the timelines of each activity, and the role/responsibilities for each activity.
- Schedule to review and update the PM and Ozone Management Plan on a regular basis.
- A Stakeholder "sign off" page
    - Stakeholder representatives sign to reflect their commitment to the PM and Ozone Management Plan.

4. Additional Resources

The following resources may be helpful in developing a PM and Ozone Management Plan:

- Leading Practice Review of Air Emission Reduction/Management Tools (AENV)
- AENV's Environmental Tools Guide: www.environment.gov.ab.ca/ETG/
- Alberta Environment – Air quality assessment results (http://www3.gov.ab.ca/env/air/OGS/pmozone.html)
- Clean Air Strategic Alliance – CASA Particulate Matter and Ozone Management Framework (http://www.casahome.org/?cat=89)
- Canadian Council of Ministers of the Environment – Canada-wide Standards for Particulate Matter and Ozone (http://www.ccme.ca/ourwork/air.html?category_id=99)

The following are links to air quality management plans developed in other jurisdictions with a brief description of each plan. Stakeholders in the affected airsheds should review these and other available air quality management plans to determine the best approach for their airshed.

- Greater Vancouver Regional District – http://www.gvrd.bc.ca/air/planning_plans.htm
- Capetown, South Africa – http://www.capetown.gov.za/clusters/health.asp?IDPathString=1123-1395-5607&clusid=245&catparent=5607
- Prince George - http://wlapwww.gov.bc.ca/nor/pollution/environmental/air_mgmtplan_final.html
- South Coast California Air Resources Board - http://www.aqmd.gov/aqmp/07aqmp/07AQMP_draftfinal.html
- Other California Air Resources Board Air Quality Management Plans -
- Toronto - http://www.toronto.ca/health/hphe/air_outdoor.htm
- Ottawa - http://ottawa.ca/city_services/planningzoning/2020/air/section6/6_4_en.shtml
- Windsor - http://www.citywindsor.ca/000201.asp

Appendix A: Sample Communication Plan

A Communication Plan outlines the approach that will be taken by an Airshed to engage stakeholders in the process of developing and implementing a PM and Ozone Management Plan. Key elements of a Communication Plan include the following:

- A description of the objectives of the Communication Plan
- A description of key messages the communication plan will endeavor to share with key stakeholders. Note that the key messages may not be the same for every stakeholder group. That is, some stakeholder groups will be interested in different aspects of the PM and Ozone Plan. These interests should be considered in the Communications Plan.
- A description of key stakeholders and their related interest in the project. Articulating this will help ensure that communications are tailored to the interests and needs of each stakeholder group. This may be important if the PM and Ozone Management Plan required significant change on the part of any stakeholder group.
- A description of the communication tools that will be used (e.g. meetings, memos, etc.) to communicate with what stakeholders
- A description of the roles and responsibilities of key resources relative to communications. The following table may be useful to complete this element of the plan.

Appendix B: Excerpt from the CASA Particulate Matter and Ozone Management Framework

2.4.2.2 Principles that apply below the Numeric CWS

Recognizing that the focus of the management framework below the numeric CWS is Keeping Clean Areas Clean and Continuous Improvement, the following guiding principles and concepts apply:

a) The action trigger concentrations are neither "pollute up to" levels, nor "not to exceed" levels.

b) Activities should be prioritized according to available resources, contextual factors (see (e)), and air quality needs.

c) More stringent management tools are to be used as ambient concentrations approach the CWS, more flexible management tools are to be used when ambient concentrations are at baseline or surveillance levels.

d) Action triggers will be used for airshed planning. They will not be applied as "point of impingement" concentrations in relation to approval limits and conditions.

e) Contextual factors, including but not limited to:

- Population growth and density,
- Trends in ambient levels,
- The predicted impact of existing activities and initiatives,
- Economic growth forecasts,
- Age of facilities, and
- Any factors related to the overall practicality of actions will be considered in the development of mandatory plans, management plans and other activities in areas with ambient concentrations below the CWS.

f) The management framework will work towards the long-term goal of minimizing risks to human health and the environment, balancing the desire to achieve the best health and environmental protection possible in the relative near term and the feasibility and costs of reducing the pollutant emissions that contribute to elevated concentrations of PM and ozone in ambient air."

2.4.2.3 Management Plan Level

The goal of the management plan level is to prevent an exceedance of the CWS, to maintain air quality and improve air quality wherever possible. Following the additional guidance immediately below, a management plan with actions appropriate to the ambient concentrations, trends, and contextual factors will be developed and implemented by stakeholders from source and receptor areas. AENV or the affected airshed zone(s), as appropriate, may coordinate the development of a plan. If this is not done within two years, AENV may impose a plan.

For PM2.5, in addition to principles for the management framework listed above, the decision as to the content and actions under the management plan should take into account the following:

- In areas where ambient concentrations are in the higher end of the management range, where ambient concentrations are indicating a significant upward trend, or where contextual factors indicate a need for action, a more stringent management plan will be developed and implemented.
- In areas where ambient concentrations are in the lower end of the range, are indicating a significant downward trend, or contextual factors indicate little or no additional action is required, a less stringent management plan will be developed and implemented. It is possible that the activities laid out in the surveillance level would be considered sufficient in some cases.

Notes on the process:

- AENV or the affected airshed zone(s), as appropriate, leads identification of key stakeholders, both from the emissions sources and receptor communities.
- The consensus model is suggested as a model for plan development.
- Where there is an existing airshed zone, or other multi-stakeholder group with similar interests, they may choose to lead the development of a plan.
- Existing data and analysis is gathered to inform the management planning process. Additional analysis of transboundary contributions, sources, trends, growth, forecasts, reductions from other programs, existing and required monitoring etc., is performed if necessary.
- Develop and implement a management plan.
- Develop and implement a public communication/consultation strategy.
- If there is not an existing airshed zone, or other multi-stakeholder group with similar interests, a zone formation analysis could occur."

2.6 Potential Tools and Mechanisms

Management tools and regulatory mechanisms refer to a wide spectrum of actions and initiatives that can be undertaken to manage or reduce emissions of PM and precursors to PM and ozone from any or all anthropogenic sources in Alberta. These can be compulsory or voluntary in nature. Management tools and mechanisms are not solely within the purview of government, and may be developed and/or applied by the private sector, nongovernmental organizations or joint public-private efforts such as CASA or other multistakeholder groups such as airshed zones, as may be appropriate for the circumstances. Given this wide definition, a very large number of potential tools and mechanisms are implied.

In addition, concentrations of ambient PM and ozone vary across Alberta, due in part to the type, intensity and location of anthropogenic activities found in any particular area. As a result, management options are most appropriately identified on a case-by-case basis once there is an understanding of the extent and nature of the air quality concern, as well as the scale, cost and effect of the measures themselves. The framework principles outlined in 2.2 and 2.4.2.2 therefore

serve as critical guide for any decisions on management options. Management tools and mechanisms can be sorted into broad and often overlapping categories:

Tools and Mechanisms	Example
Regulatory Tools	approvals, regulations, prohibitions, regulated requirements
Standards, Codes & Guidelines	industry codes of practice, Ambient Air Quality Guidelines, New Source Performance Standards
Programs	pollution prevention planning, education & outreach
Agreements	covenants, memorandum of understandings, letters of agreement
Targets & Objectives	provincial emission targets, sectoral targets
Incentives/ Disincentives	economic instruments, recognition programs, enhanced performance programs
Municipal/ Regional Planning Approaches	zoning, urban and transportation planning
Private Sector Initiatives	voluntary reduction programs, environmental management systems, employee education & awareness programs, commuter programs

Over the course of its work, the project team identified a number of management and analytical tools to support the PM & ozone management framework, which are listed below. This is not a consensus listing, nor should it be viewed as an exhaustive list. There are also some extensive "shopping lists" of management tools and mechanisms available. These are listed as "Additional Resources" at the end of this section.

Potential Management Tools:

- Voluntary Programs and Approaches
- Existing Programs and Policies
- Environmental Assessment
- Source Performance Standards
- Pollution Prevention Planning
- Ambient Air Quality Guidelines
- Codes of Practice
- Industry Stewardship Initiatives
- Public-Private Partnerships, Agreements
- Education, Training
- Reward, recognition programs

- Land use policy and planning
- Emissions trading & other market mechanisms
- Offsetting new sources
- Establish reduction targets
- More stringent emission standards/limits
- Air Quality Index & Forecasting
- Taxes and Fees (used as either incentives or disincentives)
- Promote industrial ecology
- Energy efficiency
- Green energy policies
- Transportation Demand Management
- Zone Formation Analysis

Potential Data/Analytical Tools and Approaches

- Assess adequacy of current monitoring and ecological effects modeling
- Examine existing data on air quality trends, forecasts, and inventories
- Source Attribution
- Source Apportionment
- Emission Forecasting
- Trend Analysis
- PM speciation
- Economic analysis/cost effectiveness studies
- Model future scenarios; test the proposed plan under different conditions
- Other air quality modeling
- Examine how exceedances have been handled in other jurisdictions